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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,939	03/01/2004	Akif Sultan	AMD1:133\HON	2690
23858	7590	08/11/2006	EXAMINER	
TIMOTHY M HONEYCUTT ATTORNEY AT LAW P O BOX 1577 CYPRESS, TX 77410			HOANG, QUOC DINH	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 08/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/790,939	SULTAN ET AL.	
	Examiner	Art Unit	
	Quoc D. Hoang	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 16-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8-13 and 18-21 is/are allowed.
- 6) ☒ Claim(s) 1-7, 16 and 17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>5/12/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Amendment filed on 06/03/2006 has been entered. In Amendment, claims 14-15 have been cancelled. Claims 1-13 and 16-21 are pending in the application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3-7, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shih, (US Pat No. 6,747,325) in view of Wang et al., (US Pat No. 6,566,204 hereinafter "Wang").

Regarding claim 1, Shih teaches a method of fabricating a first halo region 427 and a second halo region 428 for a circuit device of a first conductivity type and having a gate structure 46 with first and second sidewalls, comprising:

forming the first halo region (427) of a second conductivity type by implanting a substrate (42) with impurities in a first direction (A) toward the first sidewall of the gate structure (46) (col. 6 lines 1-23 and Fig. 4g);

forming the second halo region (428) of the second conductivity type by implanting the substrate with impurities in a second direction (B) toward the second sidewall of the gate structure (col. 6 lines 1-23 and Fig. 4h); and

wherein the first and second halo regions are formed without implanting impurities in a direction substantially perpendicular to the first and second directions. *Noted that the first and second halo regions are formed only in A and B implanting directions.*

Shih teaches forming the first and second halo region but does not teach forming a mask on the substrate with an opening that exposes the device.

However, Wang teaches forming a mask (212) on the substrate with an opening (213) that exposes the device (col. 16 lines 38-45 and Fig. 11g). Since Shih and Wang are all from the same field of endeavor, the purpose disclosed by Wang would have been recognized in the pertinent art of Shih. It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to provide opening mask in order to introduce halo dopant into the intended location as taught by Wang, column 17, lines 10-20.

Regarding claim 3, Shih teaches wherein the first conductivity type comprises n-type and the second conductivity type comprises p-type (col. 6 lines 1-23).

Regarding claim 4, Shih teaches wherein the first direction A is substantially perpendicular to the first sidewall (see Fig. 4g). *Noted that first direction A can be seen substantially perpendicular to the first sidewall from the top view in Fig. 4g.*

Regarding claim 5, Shih teaches wherein the first direction A is substantially perpendicular to the first sidewall and the second direction B is substantially perpendicular to the second sidewall. *Noted that second direction B can be seen substantially perpendicular to the second sidewall from the top view in Fig. 4h.*

Regarding claim 6, Shih teaches wherein the implanting impurities in the first direction A is performed at an angle of about 0 to 30° from vertical (col. 6 line 15), but does not teach

wherein the implanting impurities in the first direction A is performed at an angle of about 15 to 45° from vertical. Although Shih's implantation in a direction is not the claimed range (15 to 45° from vertical), this does not define patentable over Shih since the implantation direction is well known processing variable and the discovery of the optimum or workable range involves only routine skill in the art.

Regarding claim 7, Shih teaches wherein the implanting impurities in the second direction B is performed at an angle of about 0 to 30° from vertical (col. 6 line 55), but does not teach wherein the implanting impurities in the second direction B is performed at an angle of about 15 to 45° from vertical. Although Shih's implantation in a direction is not the claimed range (15 to 45° from vertical), this does not define patentable over Shih since the implantation direction is well known processing variable and the discovery of the optimum or workable range involves only routine skill in the art.

Regarding claim 16, Shih teaches wherein the impurities of the first and second halo regions comprise boron (col. 7, lines 22-25).

Regarding claim 17, Shih teaches wherein the impurities of the first and second halo regions comprise phosphorus (col. 7, lines 22-25).

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shih., (US Pat No. 6,747,325) in view of Cho et al., (US Pat No. 6,784,062 hereinafter "Cho").

Regarding claim 2, Shih teaches wherein the first conductivity type comprises n-type and the second conductivity type comprises p-type (col. 6 lines 1-23), but does not teach wherein the first conductivity type comprises p-type and the second conductivity type comprises n-type.

However, Cho teaches wherein the first conductivity type comprises p-type (p-channel transistor) and the second conductivity type comprises n-type (col. 4, lines 1-6 and Fig. 5, n-type halo region 52). Since Shih and Cho are all from the same field of endeavor, the purpose disclosed by Cho would have been recognized in the pertinent art of Shih. It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to have second conductivity type comprises n-type so that the doping in the channel region and the halo region is the same type.

Allowable Subject Matter

5. Claims 8-13 and 18-21 are allowed.

The following is an examiner's statement of reasons for allowance: None of the references of record teaches or suggest the claim method of fabricating halo regions comprising implanting the substrate in a first and second directions perpendicular to the first axis without implanting impurities in a direction substantially parallel to the first axis, and implanting the substrate in a third and fourth directions perpendicular to the second axis without implanting impurities in a direction substantially parallel to the second axis and among other limitations as claimed in independent claim 8.

The following is an examiner's statement of reasons for allowance: None of the references of record teaches or suggest the claim method of fabricating halo regions wherein the first and second halo regions of the first group of n-channel transistors and the first group of p-channel transistors are formed without implanting impurities in a direction substantially perpendicular to the first and second directions, and the third and fourth halo regions of the second group of n-channel transistors and the second group of p-channel transistors are formed

without implanting impurities in a direction substantially perpendicular to the third and fourth directions and among other limitations as claimed in independent claim 18.


Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quoc Hoang whose telephone number is (571) 272-1780. The examiner can normally be reached on Monday-Friday from 8.00 AM to 5.00 PM.

If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MinSun Harvey can be reached on (571) 272-1835. The fax phone numbers of the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and (571) 273-8300 for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Quoc Hoang
Patent examiner/AU 2818


08/05/2006